

REMARKS

This paper is being provided in response to the Office Action mailed November 25, 2002, for the above-referenced application. In this response, Applicants have amended claims 1, 2, 6, 25 and 26 to clarify that which Applicants consider to be the invention. Further, Applicants have amended the Title and the Abstract as requested by the Examiner. Applicants respectfully submit that the amendments to the claims are supported by the specification as originally filed and that the modifications to the specification do not add new subject matter.

The objections to the Title and Abstract have been addressed herein according to the guidelines set forth in the Office Action. Accordingly, Applicants respectfully request that these objections be reconsidered and withdrawn.

The objection to the drawings is hereby traversed and reconsideration is respectfully requested. The Office Action states that the feature of "at least one rough portion formed below the reflective layer" as recited in claim 12 must be shown or the feature canceled from the claim. Applicants respectfully direct attention to Figure 2 in which at least one rough portion 100 is shown formed below the reflective layer 23 as recited in claim 12. Accordingly, Applicants respectfully request that this objection be reconsidered and withdrawn.

The objections to claims 1, 2, 8, 9 and 12-14 because of informalities have been addressed by the amendments to the claims contained herein according to the guidelines set forth in the Office Action. Accordingly, Applicants respectfully request that these objections be reconsidered and withdrawn.

The objection of claim 5 because of informalities is hereby traversed and reconsideration is respectfully requested. The Office Action states (with emphasis) that page 11, lines 10-15 and Figure 2 of Applicants' specification describes a light-shielding layer disposed on an area of ONLY ONE switching element. Applicants respectfully submit that the words ONLY ONE do not appear in the cited portion of Applicants' specification. Moreover, Applicants' specification describes and shows the concept of a shielding layer disposed on an area of at least one of the plurality of switching elements, as claimed by Applicant. It can be appreciated that a liquid crystal display includes multiple switching elements on a thin film transistor substrate (see, e.g. Applicants' disclosure on page 2, lines 11-16). Applicants respectfully submit that interpreting Applicants' disclosure as showing that in a liquid crystal display containing multiple switching elements, a shielding layer is disposed *only one* switching element is not justified. Applicants have illustrated portions of a reflection type liquid crystal display and respectfully submit that all of the claimed features of the invention are adequately shown and described in the specification. Accordingly, Applicants respectfully request that this rejection be reconsidered and withdrawn.

The objection of claim 6 because of informalities is hereby traversed and reconsideration is respectfully requested. The Office Action states that "said thin film transistor comprises" should be deleted since it is a repetition of the limitation recited in claim 1. It is unclear which limitation from claim 1 is being repeated. Claim 6 depends from claim 2 which in turn depends from claim 1. Claim 2 recites the feature that the plurality of switching elements introduced in claim 1 includes at least a thin film transistor. Claim 6 recites further features of the thin film transistor introduced in claim 2. Removing the phrase "said thin film transistor comprises"

would appear to introduce a question as to what the recitation of claim 6 refers. Applicants have corrected "a gate electrode" to read "the gate electrode" as pointed out by the Examiner. Accordingly, Applicants respectfully request that this objection be reconsidered and withdrawn.

The rejection of claims 8, 9, 25 and 26 under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, as the time the invention was filed, has possession of the invention is hereby traversed and reconsideration is respectfully requested.

The Office Action rejects claim 8 as reciting subject matter not described in the specification as originally filed by reciting the "reflective layer is formed of at least one of aluminum and an aluminum alloy." The Office Action cites (with emphasis) Applicants' specification page 5, lines 19-20 as reciting that the reflective layer is ONLY formed of either aluminum or an aluminum alloy. Applicants respectfully submit that the words ONLY and either do not appear in the cited portion of Applicants' specification. Applicants disclose that the reflective layer is preferably formed of aluminum or aluminum alloy. Applicants respectfully submit that this disclosure adequately supports Applicants' recitation of "at least one of aluminum and an aluminum alloy" in dependent claim 8. Accordingly, Applicants respectfully request that this rejection and that of dependent claim 9 be reconsidered and withdrawn.

Applicants have amended claims 25 and 26 herein in accordance with the guidelines set forth in the Office Action. Applicants have amended claims to clarify the recitation the

switching elements. Further, Applicants have deleted the unclear language identified by the Examiner concerning the material constituting said switching elements and submit that the feature at issue is recited later in claim 25 as written and has been added in claim 26. Accordingly, Applicants respectfully request that these rejections be reconsidered and withdrawn.

The rejection of claims 1, 2, 4-6, 8 and 12 (and 25, 26) under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,118,505 to Nagata et al. (hereinafter "Nagata") in view of U.S. Patent No. 5,940,154 to Ukita et al. (hereinafter "Ukita") is hereby traversed and reconsideration is respectfully requested.

Independent claim 1 recites a reflection type liquid crystal display. A pair of substrates are disposed opposite to each other with a liquid crystal layer disposed therebetween. A plurality of switching elements are formed on one surface of at least one of said pair of substrates. A reflective layer is constituted of a same material as a material constituting an electrode of said plurality of switching elements and is simultaneously formed during formation of the electrode of the plurality of switching elements on a same plane as a plane of the electrode. A transparent pixel electrode is formed on the reflective layer via an insulation layer and connected to at least one electrode included in at least one of the plurality of switching elements. Claims 2, 4-6, 8, 9 and 12-14 depend directly or indirectly on independent claim 1.

Independent claim 25 recites a reflection type liquid crystal display with a pair of substrates disposed opposite to each other via a liquid crystal layer, and a plurality of switching

elements formed on one surface of the substrates. A reflective layer is simultaneously formed during formation of the switching elements. A transparent pixel electrode is formed on the reflective layer via an insulation layer and connected to one electrode of the switching element. The switching element is a thin film transistor, and the reflective layer is formed of the same material as the gate electrode of said thin film transistor and on the same plane as the gate electrode. There is a rough portion formed below the reflective layer, and covers the rough portion.

Independent claim 26 recites a reflection type liquid crystal display with a pair of substrates disposed opposite to each other via a liquid crystal layer, and a plurality of switching elements formed on one surface of the substrates. A reflective layer is simultaneously formed during formation of the switching elements. A transparent pixel electrode is formed on the reflective layer via an insulation layer and connected to one electrode of the switching element. The thin film transistor has a gate electrode electrically connected to a scanning line, a gate insulation film formed to cover the gate electrode, a semiconductor layer formed on the gate insulation film, a drain electrode electrically connected to a signal line, and a source electrode electrically connected to the transparent pixel electrode. The reflective layer is electrically separated from the gate electrode and is formed of a same material as the gate electrode and on a same plane as a plane of the gate electrode. A rough portion is formed below the reflective layer, and covers the rough portion.

The Nagata reference discloses a transmission type liquid crystal display device using transparent organic film color layers. The liquid crystal display device includes an active matrix

substrate, a counter substrate disposed to face the active matrix substrate, and a liquid crystal layer interposed between the active matrix substrate and the counter substrate. An interlayer insulating film, formed by a transparent organic film color layer, is formed on the active matrix substrate and pixel electrodes are formed on the interlayer insulating film in a matrix.

The Ukita reference discloses a reflection type liquid crystal display device utilizing a staggered type transistor. A reflection plate 2, shown in Figure 3, is disclosed as being located in a layer below the pixel electrode 6, and below the gate 9.

Applicants' independent claims all recite at least the feature that *a reflective layer is constituted of a same material as an electrode* of the plurality of switching elements and simultaneously formed...*on a same plane as a plane of the electrode* in a device that also includes a transparent pixel electrode formed on the reflective layer. Applicant's invention eliminates setting change-over requirements in manufacturing processes between a reflection type liquid crystal display device and a transmission type liquid crystal display device. (See page 15, lines 6-27).

Applicants respectfully submit that neither Nagata nor Ukita, whether taken alone or in any combination, teach or suggest at least the above feature. Specifically, Nagata discloses a transmission type liquid crystal display device and does disclose a reflective layer. Hence, Nagata does not teach any material types or locations for a reflective layer. Ukita teaches a reflection type liquid crystal display device with transparent pixel electrodes but does not teach that the reflective layer is formed of a same material as an electrode of a switching element nor

that the reflective layer is formed on a same plane as an electrode of a switching element. Specifically, Ukita discloses a reflection plate 2 that is positioned below a dielectric film layer 3 and not in the same plane as an electrode of a switching element. (See Ukita's Figure 3).

Applicants respectfully submit that the prior of record does not teach or fairly suggest *a reflective layer is constituted of a same material as an electrode* of the plurality of switching elements and simultaneously formed...*on a same plane as a plane of the electrode* in a device that also includes a transparent pixel electrode formed on the reflective layer, as is claimed by Applicants. Accordingly, based on the above, Applicants respectfully request that this rejection be reconsidered and withdrawn.

Furthermore, since Nagata discloses a transmission type liquid crystal display device the pixel electrode must be transparent, and thus any reflective layer cannot be provided at a pixel region. This is in contrast with the reflection type liquid crystal display device disclosed by Ukita where a reflective member is arranged in a pixel region. Applicants respectfully submit that the structural differences between a transmission type liquid crystal display device and a reflection type liquid crystal display device are such that one of ordinary skill in the art would not reasonably combine the teachings of Nagata and Ukita to produce Applicants' claimed invention and would have no motivation to do so.

The rejection of claim 9 under 35 U.S.C. 103(a) as being unpatentable over Nagata in view of Ukita and further in view of U.S. Patent No. 5,811,835 to Seiki et al. (hereinafter

"Seiki") is hereby traversed and reconsideration is respectfully requested in view of the amendments to the claims contained herein.

The features of independent claims 1, 25 and 26 have been discussed. Claim 9 depends from independent claim 1.

The Seiki reference discloses a liquid crystal display device in which the gate and signal lines, and the pixel electrodes formed of two conductive materials. The two materials include aluminum and chromium, tantalum, titanium and tungsten.

Applicants respectfully submit that Seiki fails to overcome the above-noted deficiencies of Nagata and Ukita with respect to Applicants' claimed invention. Applicants respectfully submit that the prior of record does not teach or fairly suggest *a reflective layer is constituted of a same material as an electrode* of the plurality of switching elements and simultaneously formed...*on a same plane as a plane of the electrode* in a device that also includes a transparent pixel electrode formed on the reflective layer, as is claimed by Applicants. Accordingly, based on the above, Applicants respectfully request that this rejection be reconsidered and withdrawn.

The rejection of claims 13 and 14 under 35 U.S.C. 103(a) as being unpatentable over Nagata in view of Ukita and further in view of U.S. Patent No. 5,610,741 to Kimura (hereinafter "Kimura") is hereby traversed and reconsideration is respectfully requested.

The features of independent claims 1, 25 and 26 have been discussed. Claims 13 and 14 depend from independent claim 1.

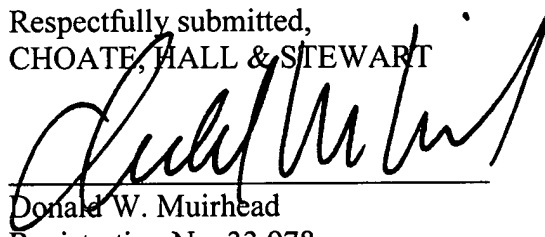
The Kimura reference discloses a reflection type liquid crystal display device with a reflection portion that has a bumpy surface. The ratio of the surface area of the reflection layer to a smooth reflection layer is from 60% to 100%.

Applicants respectfully submit that Kimura fails to overcome the above-noted deficiencies of Nagata and Ukita with respect to Applicants' claimed invention. Applicants respectfully submit that the prior of record does not teach or fairly suggest *a reflective layer is constituted of a same material as an electrode* of the plurality of switching elements and simultaneously formed...*on a same plane as a plane of the electrode* in a device that also includes a transparent pixel electrode formed on the reflective layer, as is claimed by Applicants. Accordingly, based on the above, Applicants respectfully request that this rejection be reconsidered and withdrawn.

Based on the above, Applicant respectfully requests that the Examiner reconsider and withdraw all outstanding rejections and objections. Favorable consideration and allowance are earnestly solicited. Should there be any questions after reviewing this paper, the Examiner is invited to contact the undersigned at 617-248-4038.

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Respectfully submitted,
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